

Remarks/Arguments:

Claim Rejections Under 35 U.S.C. §112

Claims 15-21 stand rejected under 35 U.S.C. §112, second paragraph.

The Office Action indicates that the term 'type' is indefinite. Applicants have removed the term 'type' from claims 15 and 22.

The Office Action indicates that the written description fails to disclose corresponding structure, material or acts for the recited "means for monitoring... and determining." Applicants have amended claim 15 to clarify that the electronic control unit (e.g., ECU 16) monitors the hydraulic delivery rate of the pump and determines quantities of gas or air at the suction side of the pump based on the monitored hydraulic delivery rate. Support for this amendment may be found, for example, at paragraphs [0016] through [0018] of the clean copy of the substitute specification. Withdrawal of this rejection is respectfully requested in view of the Applicants' amendments to the claims.

Claim Rejections Under 35 U.S.C. §103

Claims 15-28 stand rejected under 35 U.S.C. §103 as unpatentable over U.S. Patent No. 6,517,170 (Hofsaess et al.) in view of U.S. Patent No. 4,255,088 (Newton et al.). Applicants traverse these rejections for the reasons set forth below.

Independent claim 15 recites an "electrohydraulic brake system for motor vehicles having a brake-by-wire system including: a hydraulic pressure source that can be actuated by means of an electronic control unit and is comprised of a hydraulic pump driven by an electric motor and a high-pressure accumulator adapted to be recharged by the pump, wherein the electronic control unit monitors the hydraulic delivery rate of the pump and determines quantities of gas or air at the suction side of the pump based on the monitored hydraulic delivery rate."

"To establish a *prima facie* case of obviousness, ... the prior art reference (or references when combined) must teach or suggest all the claim limitations." M.P.E.P. §2143. The Office Action cites Hofsaess et al. as teaching an electrohydraulic brake system, but acknowledges that Hofsaess et al. "do not teach wherein a means is provided for monitoring the hydraulic delivery rate of the pump and determining quantities of gas or air at the suction side of the

pump based on the monitored hydraulic rate." Newton et al. is cited by the Office Action for teaching these missing limitations.

As will be described in greater detail below, in contrast to the language of claim 15, Newton et al. determines quantities of gas in the pump by analyzing the pump pressure as a function of the position of the pump piston. Newton et al. does not determine quantities of gas in the pump by analyzing the hydraulic delivery rate of the pump.

More particularly, as disclosed at column 2, lines 6-35 of Newton et al.:

pump pressure and pump volume change are sensed and processed to yield compressibility data. Low compressibility is indicative of the absence of gas in the pump chamber since gas is compressible while the liquid which is to be pumped is not compressible. High compressibility is indicative of the presence of gas. A bubble of contained gas is indicated at 26 and can undesirably cause the liquid delivery rate to be less than that set for the pump.

In order to obtain the pump pressure data, a pressure transducer 28, which may be of a conventional type such as that illustrated in FIG. 6, is connected to the chamber of pump 10. In order to obtain the pump volume change data, advantage may be taken of the fact that the lower surface area of piston 12, of course, remains constant over a pump cycle. Hence, the volume change is a function of piston position. As will be described hereinafter, any signal proportional to this position may be employed such as pulses derived from a photo optical shaft encoder 30 or from the output of an LVDT 32.

The pump pressure data and piston position data is applied to motor control circuitry 34, the purpose of which is to control motor 16 and thus, the delivery rate of pump 10. (Emphasis added)

Newton et al. further explains at column 5, lines 51-56, that "circuitry 46 obtains compressibility data by determining the change of pump pressure with respect to change in pump volume to thus determine the amount of gas, if any, present in pump 10." (emphasis added). In other words, Newton et al. teach that the amount of gas present in the pump is a function of pump pressure with respect to a change in pump volume (as tracked by the position of the piston). This is a measure of compressibility, as opposed to a measure of the hydraulic delivery rate (note the absence of a measure of Time in the graph of Figure 2 of Newton et al.).

Since the references, alone or in any reasonable combination, do not teach or suggest each and every element as set forth in the claim, the Office Action has not established a *prima facie* case of obviousness. It is respectfully submitted that independent claim 15 is in condition

for allowance. Claims 16-21 each depend from claim 15 and should each be allowed for at least the reasons set forth above.

Furthermore, dependent claim 16 further recites that "the hydraulic delivery rate is monitored by determining the electromotive force of the electric motor driving the hydraulic pump." The Office Action does not provide any support for this limitation being found in any of the cited references. Since the references, alone or in any reasonable combination, fail to teach or suggest each and every element as set forth in the claim, the Office Action fails to establish a *prima facie* case of obviousness.

Furthermore, dependent claim 17 further recites that "the hydraulic delivery rate is monitored by determining the electric power consumption of the electric motor driving the hydraulic pump." The Office Action fails to provide any support for this limitation being found in any of the cited references. Since the references, alone or in any reasonable combination, fail to teach or suggest each and every element as set forth in the claim, the Office Action fails to establish a *prima facie* case of obviousness.

Furthermore, dependent claim 18 further recites that "the hydraulic delivery rate is monitored by determining the rotational speed of the electric motor driving the hydraulic pump." The Office Action fails to provide any support for this limitation being found in any of the cited references. Since the references, alone or in any reasonable combination, fail to teach or suggest each and every element as set forth in the claim, the Office Action fails to establish a *prima facie* case of obviousness.

Similar to claim 15, independent claim 22 recites a "method of monitoring an electrohydraulic brake system for motor vehicles having a 'brake-by-wire' system including a hydraulic pressure source that can be actuated by means of an electronic control unit and is comprised of a hydraulic pump driven by an electric motor and a high-pressure accumulator adapted to be recharged by the pump, wherein quantities of gas or air at the suction side of the pump are detected by determining the hydraulic delivery rate of the pump."

As explained above, the cited references do not teach or suggest detecting quantities of gas or air at the suction side of the pump by determining the hydraulic delivery rate of the pump. Since the references, alone or in any reasonable combination, fail to teach or suggest

each and every element as set forth in the claim, the Office Action fails to establish a *prima facie* case of obviousness.

It is respectfully submitted that independent claim 22 is condition for allowance. Claims 23-28 each depend from claim 22 and should each be allowed for at least the reasons set forth above.

Furthermore, dependent claim 23 further recites that "the hydraulic delivery rate is determined by analyzing the electromotive force of the electric motor driving the pump." The Office Action fails to provide any support for this limitation being found in any of the cited references. Since the references, alone or in any reasonable combination, fail to teach or suggest each and every element as set forth in the claim, the Office Action fails to establish a *prima facie* case of obviousness.

Furthermore, dependent claim 24 further recites that "the hydraulic delivery rate is determined by analyzing the electric power consumption of the electric motor driving the pump." The Office Action fails to provide any support for this limitation being found in any of the cited references. Since the references, alone or in any reasonable combination, fail to teach or suggest each and every element as set forth in the claim, the Office Action fails to establish a *prima facie* case of obviousness.

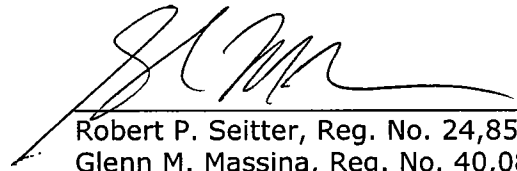
Furthermore, dependent claim 25 further recites that "the hydraulic delivery rate is determined by analyzing the rotational speed of the electric motor driving the pump." The Office Action fails to provide any support for this limitation being found in any of the cited references. Since the references, alone or in any reasonable combination, fail to teach or suggest each and every element as set forth in the claim, the Office Action fails to establish a *prima facie* case of obviousness.

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It is respectfully submitted that each of the pending claims is in condition for allowance. Early reconsideration and allowance of each of the pending claims are respectfully requested. If the Examiner believes an interview, either personal or telephonic, will advance the prosecution of this matter, it is respectfully requested that the Examiner get in contact with the undersigned to arrange the same.

Respectfully submitted,



Robert P. Seitter, Reg. No. 24,856
Glenn M. Massina, Reg. No. 40,081
Attorneys for Applicants

RPS/GMM/BJR/mc

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P.O. Box 980
Valley Forge, PA 19482
(610) 407-0700

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